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Network based determinants of innovation performance in yacht building clusters: Findings of the SOBAG project†

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Abstract

This paper presents the findings of a research project that was conducted to analyze the network based determinants of innovation performance in yacht building clusters of Turkey. The findings of this research specifically address the research gap in literature on the determinants of the innovativeness and competitiveness of yacht building firms, and also contribute to the discussion on the structural characteristics of the business networks of industrial clusters. The paper presents the findings relating to the innovation performance of 143 yacht/boat building firms included in the study and relates these to the structure of their networks at local, national and global levels. The findings demonstrate that the only network feature that has an impact on innovation performance is the total size of strategic alliances rather than the total size of the local, national or global networks, and the expected association between innovation performance and business performance is confirmed.

Keywords: Innovation performance, yacht building clusters, multi-level networks, network structure, business performance.

Introduction

The modern yacht/boat building industry in Turkey, though having rich traditional roots in wooden boat building crafts, remained as an unrecognized, underappreciated field of business for many segments

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of society. During the last twenty years this traditional wooden boat building craft agglomerated in some geographical regions of Turkey transformed itself into a luxury yacht building business activity (Uyanık & Sarı, 2008). It is generally surprising for many people in Turkey to learn that for the last two years Turkey ranked as the third country in the world receiving mega yacht orders (Global Order Book, 2011 and 2012) and as the fifth country in the total number of yacht orders delivered in the world (www.ubak.gov.tr, 2010). This paper presents some important findings of a large research project that aims to analyze the network based determinants of innovation performance in clusters through an empirical study on the business networks of yacht building firms clustered in certain regions of Turkey (pilot study was presented in Sarvan et al., 2011).

1. Theoretical Background and Research Hypotheses

This research project was based on theoretical work dealing with the innovation performance of cluster firms embedded in multi-level business and information sharing networks. This topic rests on the intersection of scholarly work on clusters, innovation and knowledge-based view of the firm. The origins of clustering research date back to the work of Adam Smith (1776) and Alfred Marshall (1890) who inspired many economists and management scholars to explore the dynamics of spatial agglomeration (McCann and Folta, 2008). Paul Krugman (1991), Anne Lee Saxenian (1994) and Michael Porter (1990, 1998, 2000) were the forerunners of different research tracks conducted in various industries all over the world (e.g. Rosenfeld, 1997; Lagendijk, 1999; Morgan, 2004). Clustering or agglomeration research focused on two different research questions, one related with the geographical co-location of firms from different industries and the other with the geographical clustering of firms from the same or related industries. Marshall (1890/ 1920) was the first economist to emphasize the supply and demand based factors (access to specialized labor, specialized inputs, technology spillovers and access to higher demand) enjoyed by firms locating in the same region. Empirical findings of many different studies confirmed these externalities, and demonstrated that clusters improved efficiency, innovation and competitiveness in different ways (Singh, 2001).

The impact of clustering on knowledge and technology transfer and innovativeness has become an important inquiry track in knowledge management research. Studies that explore the knowledge transfer and technology spillovers in industrial clusters (Beijerse, 2000; Karlsen et al., 2003; Bathelt et al., 2004; Dahl & Pedersen, 2004; Koo, 2005; Ostergaard, 2009; Morrison & Rabellotti, 2009) and the more specific work on knowledge-based theory of the firm (Grant, 1996a, 1996b; Kogut & Zander, 1996; Nonaka, 1994; Zander & Kogut, 1995) developed the idea that the real competitive power of firms depends on their capacity to access information and create knowledge. The distinction between tacit and explicit knowledge (Nonaka,1994) is important in understanding the significance of clusters for knowledge transfer and creation. Tacit knowledge was first defined by Polanyi (1962) as knowledge that is not expressed in words, that remains intuitive and unarticulated. Tacit knowledge is particularly valued in the skill of a craft worker and the design know-how of an engineer. In contrast, explicit knowledge is formally transferable in language and symbols, it can be codified in manuals, computer programs, training programs, etc. (Adler, 1996). It is generally accepted that tacit knowledge can be more easily transferred through close social contact with people possessing this kind of knowledge. Hence industrial clusters attracted attention as a means of facilitating access to knowledge and information through social relations and the concept of 'social embeddedness' forwarded by Granovetter (1985) became a key issue in studying the impact of relationship networks on innovativeness and performance. Findings of the study by Uzzi (1996) based on the concept of 'structural embeddedness' demonstrated that the chance of survival of firms that succeed in combining embedded (strong) linkages with arms-length (weak) ties in their relationship networks was the greatest. This study proved that embeddedness provides positive returns only up to a certain level beyond which negative returns start being generated. This finding

indicated the importance of investigating the arms-length linkages of firms besides embedded links as also suggested by the concept of 'strength of weak ties' proposed by Granovetter (1983).

A number of academic studies have emphasized access to new knowledge as the most important direct benefit of social capital (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998). In their theoretical work on the intersection of social capital, networks and technology transfer, Inkpen and Tsang (2005) discuss how networks provide access to knowledge, markets and technologies for firms. Three types of networks discussed in this study are, intra-firm networks, strategic alliances and industrial districts, where strategic alliances represent strong network ties relying on repetitive transactions and multiple knowledge interfaces, and industrial districts represent weak ties relying on physical proximity. While the early clustering research emphasized the benefits the cluster firms enjoy from geographical proximity (Krugman, 1991; Porter, 1990, 1998, 2000; Saxenian, 1994), more recent work, though confirming the importance of local linkages for knowledge spillovers, technology transfers and innovativeness, demonstrated the significance of global linkages (Armatlı-Köroğlu, 2005; Asheim and Isaksen, 2002; Bathelt et al., 2004; Eraydın and Armatlı-Köroğlu, 2005; Simmie, 2003). Empirical work and observations on the development of industrial clusters for more than 20 years have led scholars to widely critisize the emphasis on internal dynamics and resources, and to direct attention to the global cooperation and knowledge transfers among different types of networks and value chains. Overall conclusion to be drawn from the recent studies is that it is worthwhile to investigate the effects of multi-level network ties on the innovativeness of cluster firms.

Motivated by the recent findings of the relevant literature, the authors found it as a worthwhile research topic to inquire the structural properties (number and strength) of in-cluster (local) and out-of-cluster (national and global) business networks of firms operating in the yacht building clusters which are expected to be linked to external markets with respect to their inputs and outputs, and to relate these properties with the innovation and business performance of cluster firms. In accordance with the concept of 'structural embeddedness' developed by Uzzi (1996) this study investigates the total size of the relationship networks of yacht building firms, and more specifically questions their strength by asking the number of (local, national and global) relations perceived as a source of information and also as a strategic alliance. Basing on the findings of studies by Armatlı-Köroğlu (2005) and Eraydın and Armatlı-Köroğlu (2005), three hypotheses were developed: i) The total size of local network will have a positive impact on innovation performance (H1); ii) the total size of national network will have a positive impact on innovation performance (H2); iii) the total size of global network will have a positive impact on innovation performance (H3). And relying on the literature on strategic alliances which supposes that strategic alliances represent strong linkages in the business networks of firms another hypothesis was developed to see if the size of such strong networks increased innovation performance: iv) The total size of network accepted as strategic alliances will have a positive impact on innovation performance (H4). Finally, it was also questioned whether there is a positive relationship between innovation performance and business performance of firms (H5) as suggested by the relevant literature (Deshpande et al., 1993; Hult et al., 2004).

2. Method

2.1. Universe and sample of the study

Preliminary data about the universe of the study were obtained from some official websites. According to the sector report issued by the Turkish Ministry of Transportation in 2010, Turkey was indicated as ranking the fifth country receiving yacht orders in the world with a share of 9% (www.ubak.gov.tr, 2010). On the official website of the Chamber of Shipping, the total number of registered yacht builders was indicated as 360 (62 in İstanbul, 48 in Antalya, 48 in İzmir, 44 in Marmaris, 25 in Fethiye, 41 in Bodrum,

45 in Black Sea Region, and 47 in other places) (www.dtoizmir.org, 2010). The authors of the study conducted a series of data searching techniques to obtain a reliable list of firms actually operating in the regions mentioned above, in order to be able to get in touch with a representative sample of firms from each region. Internet sources provided various listings, member lists were requested from the Chambers of Trade and Chambers of Shipping and from various associations or cooperatives formed by yacht/boat building firms. Appointments for semi structured interviews were made with the top level managers of the yacht building firms in these locations and during the visit the structured questionnaire developed by the researchers were filled out by the same managers. Eventually a total of 143 firms (39 in İstanbul/Tuzla-Pendik, 30 in Bodrum, 22 in Antalya, 16 in İzmir, 13 in Bartın and Cide, 7 in Marmaris, 5 in Fethiye, 5 around Yalova-Kocaeli, 4 in Manavgat and 2 in Bursa/Orhangazi) were interviewed during the site visits. This sample in total represents 78% of yacht/boat building firms that were designated to be in business as of the date of visit in the regions in the scope of the field study (respective percentages of sample representativeness are 0.66 in İstanbul, 0.96 in Bodrum, 0.91 in Antalya, 0.76 in İzmir, 0.65 in Bartın and Cide, 0.87 in Marmaris, 1.00 in Fethiye, 0.85 around Yalova-Kocaeli, 1.00 in Manavgat and 0.50 in Bursa). Since the regions visited comprise the major yacht/boat building areas all over Turkey, this study can safely boast to describe the situation in 78% of the industry.

2.2. Data collection tool

The structured questionnaire of the study was based on the objectives of the study, and it was composed of 7 parts, the 1st pertaining to some relevant information about the firm; the 2nd pertaining to innovation performance (scale adapted to the sector from the study by Varis & Littunen, 2010) and innovativeness of the firm (scale adapted from the study by Calantone et al., 2002), the third pertaining to the intellectual capital of the firm (scale adapted from the study by Kianto et al., 2010), the fourth pertaining to the relational capital of the yacht building cluster (scale adapted to the sector from the study by Molina-Morales & Martinez-Fernandez, 2006); the fifth pertaining to the local, national and global linkages in the knowledge sharing networks of the firms (scale developed by the authors); the sixth pertaining to the satisfaction with the performance of the firms (scale adapted from the study by Venkatraman, 1989) and the seventh pertaining to some demographic information about the person interviewed. The current paper will only discuss data concerning the first two parts and the fifth and sixth parts of the questionnaire.

2.3. Findings

2.3.1. Descriptive statistics

The general profile of the sample firms regarding the dependent variables, namely innovation performance and business performance, and the independent variables relating to certain dimensions of the business and information sharing networks are summarized in Table 1. In discussing the findings presented in this table, only four major clustering areas (İstanbul, Bodrum, İzmir and Antalya) will be included in the comparisons, since the other areas do not deserve to be handled as yacht building clusters.

2.3.1.1. Innovation performance

The innovation performance scale was adapted by the authors from the scale used by Varis & Littunen (2010). The respondents were asked to reply for each item the degree of novelty introduced on a 5-response scale. And in evaluating the results, only the first two responses were accepted as an innovation, and the firm was given a score of one for each innovation area (product, process, marketing and organization) if there was at least one item checked in that category. The other responses were coded as ‘no innovation’. The firms were given a score out of 4, depending on the number of accepted innovations

for each category. The lowest average innovation performance was found in İstanbul (1.92 ± 1.42) and the highest in Bodrum (2.37 ± 1.3). These measures indicated a quite modest degree of innovation performance in all clusters.

2.3.1.2. Business performance

As the innovation literature assumes a positive relationship between innovation and performance, another dependent variable measuring certain performance dimensions relevant for the sector was used to evaluate performance. The scale was adapted from the subjective performance evaluation scale developed by Venkatraman (1989). Business performance was measured on a 5-point Likert scale of satisfaction asking the subjective evaluation of a list of performance measures by the interviewed managers. The lowest business performance was found for Bodrum (2.72 ± 0.6) and the highest for İstanbul (2.92 ± 0.8). All these measures also indicated a modest degree of business performance for all clusters.

Table 1. Descriptive Statistics

	General				İstanbul				Bodrum				Antalya Free Zone				İzmir			
DEPENDENT VARIABLES	$\bar{X}$	**N**	**%**	**Sd**	$\bar{X}$	**N**	**%**	**Sd**	$\bar{X}$	**N**	**%**	**Sd**	$\bar{X}$	**N**	**%**	**Sd**	$\bar{X}$	**N**	**%**	**Sd**
Innovation (product/ process/marketing/organization) performance	2.00	143		1.34	1.92	39		1.42	2.37	30		1.3	1.94	19		1.17	2.31	16		1.57
Business Performance	2.91	143		0.8	2.92	39		0.8	2.72	30		0.6	2.8	19		1	2.79	16		1.1
INDEPENDENT VARIABLES Business and information sharing networks																				
Total size of multi-level Networks	**93.86**	**143**	**1.00**	**141**	**90.5**	**39**	**1.00**	**126**	**83.52**	**30**	**1.00**	**70**	**188.68**	**19**	**1.00**	**213**	**42.24**	**16**	**1.00**	**42.8**
-Total size of local networks	27.34	143	0.29	27.6	33.28	39	0.37	27	30.53	30	0.37	28	39.21	19	0.21	33	13.56	16	0.32	13.7
-Total size of national networks	40.20	143	0.44	63.4	22.94	39	0.25	34	35.93	30	0.43	24	80	19	0.42	92	20.25	16	0.48	16.8
-Total size of global networks	25.32	143	0.27	51.5	34.28	39	0.38	65	17.06	30	0.20	18	69.47	19	0.37	88	8.43	16	0.20	12.3
Total size of networks perceived as source of information	**55.39**	**143**	**1.00**	**86.5**	**47.17**	**39**	**1.00**	**56**	**48.79**	**30**	**1.00**	**51**	**148.09**	**19**	**1.00**	**173**	**27.24**	**16**	**1.00**	**32**
-Total size of local networks perceived as source of information	17.40	143	0.31	20.2	18.89	39	0.40	17	19.96	30	0.41	25	31.57	19	0.21	30	9.56	16	0.35	11.9
-Total size of national networks perceived as source of information	22.32	143	0.41	34.3	13.82	39	0.29	20	17.53	30	0.36	12	61.26	19	0.41	75	12	16	0.44	10.8
-Total size of global networks perceived as source information	15.67	143	0.28	32	14.46	39	0.31	20	11.3	30	0.23	14	55.26	19	0.37	68	5.68	16	0.21	9.25
Total size of networks accepted as strategic alliances	**8.21**	**143**	**1.00**	**22**	**3.66**	**39**	**1.00**	**8.8**	**7.42**	**30**	**1.00**	**16**	**30.83**	**19**	**1.00**	**40**	**5.17**	**16**	**1.00**	**19.6**
-Total size of local strategic alliances	2.8	143	0.34	6.06	2.33	39	0.64	6.1	4.43	30	0.60	8.9	4.15	19	0.13	5.3	3.12	16	0.60	5.74
-Total size of national strategic alliances	2.58	143	0.32	6.44	0.51	39	0.14	1.2	1.53	30	0.21	2.8	11	19	0.36	14	1.68	16	0.32	3.85
-Total size of global strategic alliances	2.83	143	0.34	9.43	0.82	39	0.22	1.4	1.46	30	0.20	4.6	15.68	19	0.51	21	0.37	16	0.07	10

2.3.1.3. Business and information sharing networks

In accordance with the hypotheses explained above, the authors have developed a scale that inquires the total size of the multi-level (local-national-global) business, information sharing and strategic alliance relationships of firms. The items of the scale were specially prepared to fit the sector, including all types of potential network actors grouped in four categories: Actors supporting production (suppliers and sub-contractors), service providers (all sorts of consulting and services), marketing agents and information

providers (competing firms, friends, public and nongovernmental organizations). The respondents were asked to fill in the number of network actors they are affiliated with for each functional area (24 items) in the corresponding level, and report also the strength of linkage with these actors by filling the columns to indicate the numbers of actors in that category accepted as a source of information for the firm; and on the third column the numbers of actors who are perceived as strategic partners. The perceived strategic partnerships were taken as a measure of strong ties relying on repetitive transactions and multiple knowledge interfaces, perceived information sources were taken as weak ties relying on information exchange.

As will be seen in Table 1, the average size of multi-level networks varies between major yacht building clusters. AFZ firms have the biggest average network (188.68 ± 213) and İzmir the smallest (42.24 ± 43), Istanbul (90.5 ± 126) and Bodrum (83.52 ± 70) remaining in the middle. In these multi-level networks, national ones generally comprise the highest part (48% in İzmir, 43% in Bodrum, 42% in AFZ) except for İstanbul (25%) for which this percentage refers to regions outside Istanbul, while for others 'national' stands generally for linkages with firms in İstanbul. Since İstanbul represents a metropolitan area accommodating a lot of industries and other institutional structures, the firms located around Tuzla-Pendik are able to form networks with the local suppliers and outsourcing firms.

This is why the highest percentage of local networks was reported for Istanbul (37%) and Bodrum (37%), İzmir ranking the second (32%), and AFZ ranking the last (21%). These percentages also represent the degree that each local cluster meets the business network needs of the yacht building firms. The average global network size is the biggest for İstanbul (38%), AFZ (37%) following it closely, Bodrum and İzmir (20%) comparatively smaller.

This data reveals diverse network structures for each major cluster. AFZ cluster is dominated by national and global linkages, İstanbul cluster is dominated by local and global linkages, Bodrum and İzmir clusters are dominated by local and national linkages. The difference between AFZ and İstanbul clusters reflects the fact that the national linkages for AFZ are situated mostly in İstanbul which constitute local linkages for İstanbul firms. But they stand close to each other with respect to the weight of global linkages. Bodrum and İzmir, on the other hand have a much higher weight of national linkages (0.43 and 0.48 respectively). It can be derived from this data that İstanbul and AFZ clusters are much more dependent on global markets for supplies and customers compared to Bodrum and İzmir.

Another set of data relevant for this paper concerns the total size of networks perceived as a source of information. Again, the average size of networks perceived as source of information varies between major yacht building clusters. AFZ firms have the biggest average network (148.09 ± 173) and İzmir the smallest (27.24 ± 32), Istanbul (47.17 ± 56) and Bodrum (48.79 ± 51) remaining close to the lower end. The distribution of the network linkages perceived as source of information among local, national and global levels reveals very similar network structures as the total networks. AFZ cluster is dominated by national and global linkages, İstanbul cluster is dominated by local and global linkages, Bodrum and İzmir clusters are dominated by local and national linkages in this category.

The total size of networks perceived as strategic alliances which represent strong ties with network members was also investigated in this study. Again, the average size of networks perceived as strategic alliances varies between major yacht building clusters. AFZ firms have the biggest average network (30.83 ± 40) and İstanbul the smallest (3.66 ± 8.8), Bodrum (7.42 ± 16) and İzmir (5.17 ± 19.6) also remaining quite low. The distribution of the strategic network linkages among local, national and global levels demonstrates very similar network structure as the total network. AFZ cluster is dominated by

national and global linkages perceived as strategic alliances, İstanbul cluster is dominated by local and global linkages, Bodrum and İzmir clusters are dominated by local and national linkages.

2.3.2. Hypothesis testing

Data presented in Table 1 was used to test the hypotheses that i) the total size of local network will have a positive impact on innovation performance (H1); ii) the total size of national network will have a positive impact on innovation performance (H2); iii) the total size of global network will have a positive impact on innovation performance (H3); iv) the total size of the network accepted as strategic alliances will have a positive impact on innovation performance (H4); and v) there is a positive relationship between innovation performance and business performance of firms (H5). Chi-square tests were conducted for tables 2 to 5 to examine the differences between any of the groups of total size of network in relation to the level of innovation performance.

Table 2. Relationship between the Total Size of Local Network and the Level of Innovation Performance

Total Size of Local Network (grouped as)	**Level of Innovation Performance**									
	No Innovation Performance		**Low**		**Medium**		**High**		**Total**	
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**
Small	16	0.22	28	0.38	20	0.27	10	0.13	74	100
Medium	7	0.18	16	0.41	11	0.28	5	0.13	39	100
Big	4	0.22	6	0.33	3	0.18	5	0.28	18	100
Very Big	4	0.33	5	0.42	3	0.25	0	0	12	100
Total	31	0.22	55	0.38	37	0.26	20	0.14	143	100

The linear by linear association Chi-square test value was used for Table 2 for significance test while 7 cells out of 16 (43.8%) have expected count less than 5. The results of this analysis as with the values of linear by linear Chi-Square=0.361, df=1, and p=0.548, indicated no association between the groups of total size of local network and the levels of innovation performance, $p>0.05$ (H1 is rejected).

Table 3. Relationship between the Total Size of National Network and the Level of Innovation Performance

Total Size of National Network (grouped as)	**Level of Innovation Performance**									
	No Innovation Performance		**Low**		**Medium**		**High**		**Total**	
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**
Small	16	0.36	14	0.31	10	0.22	5	0.11	45	100
Medium	7	0.18	11	0.28	13	0.33	8	0.21	39	100
Big	2	0.08	13	0.54	7	0.29	2	0.08	24	100
Very Big	6	0.17	17	0.49	7	0.20	5	0.14	35	100
Total	31	0.22	55	0.38	37	0.26	20	0.14	143	100

The results of this analysis as with the values of Pearson chi-square=14.362, df=9, and p=0.11, indicated no association between the groups of total size of national network and the levels of innovation performance, $p>0.05$ (H2 is rejected).

Table 4. Relationship between the Total Size of Global Network and the Level of Innovation Performance

Total Size of Global Network (grouped as)	**Level of Innovation Performance**									
	No Innovation Performance		**Low**		**Medium**		**High**		**Total**	
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**
Small	24	0.25	34	0.36	24	0.25	12	0.13	94	100
Medium	4	0.18	8	0.36	5	0.23	5	0.23	22	100
Big	1	0.08	7	0.59	3	0.25	1	0.08	12	100

Very Big	2	0.13	6	0.40	5	0.34	2	0.13	15	100
Total	31	0.22	55	0.38	37	0.26	20	0.14	143	100

The linear by linear association Chi-square test value was used for Table 4 for significance test while 9 cells out of 16 (56,3%) have expected count less than 5. Examination of the results of this analysis as with the values of linear by linear Chi-square=0.834, df=1, and p=0.361, indicated no association between the groups of total size of global network and the levels of innovation performance, $p>0.05$ (H3 is rejected).

Pearson Chi-square test value was used for Table 5 The linear by linear association Chi-square test value was used for Table 4 for significance test while 4 cells out of 16 (25%) have expected count less than 5. Examination of the results of this analysis as with the values of linear by linear Chi-square=2.754, df=1, and p=0.097, indicated a significant association between the groups of total size of network accepted as strategic alliances and the levels of innovation performance, $p<0.10$ (H4 is accepted).

Table 5. Relationship between the Total Size of Network Accepted as Strategic Alliance and the Level of Innovation Performance

Total Size of Network Accepted as Strategic Alliance (grouped as)	**Level of Innovation Performance**									
	No Innovation Performance		**Low**		**Medium**		**High**		**Total**	
	(n)	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**	**(n)**	**(%)**
Small	16	0.28	21	0.37	9	0.16	11	0.19	57	100
Medium	9	0.20	20	0.44	15	0.33	1	0.03	45	100
Big	3	0.19	6	0.37	4	0.25	3	0.19	16	100
Very Big	3	0.12	8	0.32	9	0.36	5	0.20	25	100
Total	31	0.22	55	0.38	37	0.26	20	0.14	143	100

Table 6. Relationship between Innovation Performance and Business Performance

Type of Performance	**Descriptive Statistics (n=143)**		**Pearson Correlation and Significance**	
	$\overline{X}$	**Sd**	**r**	**p**
Innovation Performance	2.00	1.34	0.166	0.048
Business Performance	2.91	0.80		

Finally, to test the correlation between the type of performances, a Pearson correlation analysis was conducted, and a weak but significant correlation (r=0.166) was found between innovation performance and business performance and H5 was accepted, $p<0.05$.

3. Discussion and Conclusion

This study provided valuable information regarding the yacht/boat building industry in Turkey. The field study was conducted on 143 firms generally scattered (except for Bursa-Orhangazi) around the coastal regions of Turkey. Some of those regions displayed more developed cluster features (İstanbul and Bodrum), some were newly developing into a cluster (Antalya), some had deteriorated but still had a presence (İzmir), some had deteriorated in great respect (Marmaris and Fethiye), some had failed to transform into modern yacht building cluster (Bartın and Manavgat), and some failed to attract agglomeration of yacht building firms (Yalova-Kocaeli and Bursa). Among all these regions, only four regions deserved to be analysed as yacht building clusters: Istanbul, Bodrum, Antalya and İzmir. Attention to these clusters is expected to give an adequate idea about this industry.

The early cluster literature put the main emphasis on geographical proximity and local linkages, generally paying less attention to external linkages. The proposition of this extensive volume of literature concerning the positive relationship between innovation performance and local networks was tested (H1) in this study and no association was found. This finding is important, because it refutes the importance of the degree of clustering on the ability of firms to make innovations. The total number of business network linkages any firm has established in its current locality depends on the existence of potential suppliers, subcontractors, service providers, marketing actors and other information sharing firms and institutions in geographical proximity to the firm. This data can also be taken as one of the major indicators of clustering in the region. Therefore the general proposition of cluster literature was not confirmed in the context of the yacht building sector. This result can be interpreted with the dependence of the sector on non-local markets and suppliers for customers and supplies.

As proposed by more recent work which confirmed the importance of local and national linkages for knowledge spillovers, technology transfers and innovativeness, but at the same time found some evidence relating to the significance of global linkages in three industrial clusters of Turkey (Armatlı-Köroğlu, 2005; Eraydın and Armatlı-Köroğlu, 2005) the impact of national (H2) and global networks (H3) on innovation performance were also tested. No relationship was found between the size of the national networks and innovation performance (H2 was rejected) and also between the size of global networks and innovation performance (H3 was rejected). These findings may be explained with the fact that, though the yacht building sector is heavily dependent on global supplies, this need is to a great extent met by several big importers of yachting supplies generally located in İstanbul, rather than networking directly with a major distributor of a yacht equipment or accessory. For this reason, most of the companies located in regions other than İstanbul, indicate such linkages as national network ties, while firms in İstanbul indicate them as local. This differential relative position of firms with respect to the geographical level of major suppliers may be responsible for the insignificant association of local, national and global level linkages with innovation performance. These propositions need to be tested in further studies.

As suggested by the literature on strategic alliances, the impact of strong network linkages on innovation performance was also tested. This network is presumed to cover all local, national and global business linkages that are perceived as strategic alliances by the firms. This proposition was tested and significant relationship was found between the total size of networks perceived as strategic alliance and innovation performance (H4 was accepted). From the above findings we draw the conclusion that for innovation performance the factor that matters most is the total size of strategic alliances. This may be due to the fact that arms length local, national and global linkages can only provide codified knowledge which is available to anyone seeking them, but strong network ties can act as a source of tacit knowledge, which is transmitted through trustful contacts among parties of a strategic alliance.

Innovation literature generally assumes a positive relationship between innovation and business performance (Han et al., 1998; Artz et al., 2010). This relationship was confirmed with a weak correlation in this study (H5 was accepted). There can be many reasons for this result. One possible explanation can be based on the severe effects of global crisis on the yacht building sector. The field study of this research coincided with a period that the effects of the global crisis were felt most severely in the yacht building sector. In 2009 when the global crisis started to be felt, firms in this sector had projects in their hands which kept most of them going for some time. But the global shock eventually affected the demand for yachts all over the world when many second hand yachts and boats were put on sale for very good prices, posing great difficulty in getting new orders. That is why there were many firms which quit business, many others struggled to survive with minor maintenance and repair projects and still some others lowered prices to subsistence levels. This situation may be responsible for the weak relationship between innovation and performance.

The overall conclusion to be drawn about the state of the industry is that the recent global economic crisis has hit the industry severely, causing many boat builders to quit business. Despite all the efforts of the research team to find as many active firms as possible, only 185 firms were found to be in business out of the expected 360 firms reported in official sources (www.dtoizmir.org, 2010). It can be safely estimated that at least 40% of boat/yacht producers were out of business or had changed their scope of activity. Under these conditions, the firms in the sample had either some long term projects that kept them in business or they had diversified their business activities in order to survive the crisis. The average innovation (2.00 ± 1.34) and business (2.91 ± 0.8) performance of the industry were found to be rather modest. It is interesting to note that Istanbul and AFZ, remained under the industry average in innovation performance (1.92 and 1.94 respectively), while business performance averages for four regions did not differ much (between 2.79 and 2.92). Our analysis relating to the network based determinants of innovation performance indicated the importance of strong linkages as proposed by the literature on strategic alliances. Since these strong linkages were evenly distributed among local (.34), national (.32) and global (.34) levels, we concluded that it was the strength of the network ties rather than the level of ties that made an impact on innovation performance.

The overall policy implication to be drawn from this study can be summarized as follows: The yacht building sector in Turkey has achieved an outstanding position in the world especially in mega yacht segment, despite the adverse infrastructure conditions prevailing in most of the yacht building regions. The role of public policy authorities should be framed as removing the barriers and uncertainties facing the firms, providing proper infrastructure for the yacht building regions that promise to develop into successful clusters. A proper understanding of the dynamics of innovation and competitiveness will help authorities to design effective policies for this underappreciated sector.

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